

Rocky Flats Plant

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Monthly Environmental Monitoring Report

**ENVIRONMENTAL MANAGEMENT DEPARTMENT
AIR QUALITY AND CHEMICAL TRACKING DIVISION:**

N. M. Daugherty, Health Physicist/Report Coordinator
G.H. Setlock, Manager

ENVIRONMENTAL PUBLICATIONS AND COMMUNICATIONS:

D.A. Cirrinclone, Technical Editor/Graphic Design
A.M. Winzent-Dichard, Desktop Publisher

CONTRIBUTORS:

R.S. Almquist
S.K. Andrews
R.A. Deola
L.A. Dunstan
M.L. Johnson
T.G. Kallvas
W.E. Osborne
General Laboratories
H&S Laboratories



EG&G Rocky Flats, Inc.
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

A prime contractor to the
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Executive Summary

The Rocky Flats Plant is part of a nationwide Department of Energy complex for the research, development, and production of nuclear weapons. The plant is responsible for fabricating nuclear weapons components from plutonium, uranium, beryllium, and stainless steel. Primary production activities include metal fabrication and assembly, chemical recovery and purification of process-produced transuranic radionuclides, and related quality control functions.

Because radioactive and chemically hazardous materials are used or handled at the Rocky Flats Plant, the plant maintains an extensive environmental protection program. Included in that program is regular monitoring for radioactive and hazardous constituents at onsite, plant boundary, and offsite locations. This Environmental Monitoring Report provides a monthly summary of environmental monitoring data collected by the Rocky Flats Plant. Summarized below are highlights from the major data categories presented. Remaining data presented in this report are within the ranges historically measured for their respective parameters and locations.

Radiation standards for protection of the public are discussed in Appendix A of this report. The primary standards are based on calculations of radiation dose. These calculations are performed annually using monitoring data presented in the Monthly Environmental Monitoring Report. Radiation doses to the public from Rocky Flats Plant operations are typically well below any regulatory limit and far less than are received from naturally occurring radiation sources in the Denver metropolitan area (see Appendix A).

February 1992 Monitoring Data - Reporting of air effluent data, some ambient air data, and some of the onsite and offsite surface water monitoring data continues to be delayed because of damage to the Health and Safety Analytical Laboratory fume hoods during the severe blizzard that occurred March 8-9, 1992. A lightning strike to a Rocky Flats Plant transformer resulted in the burnout of fan motors for the hoods. In addition, Rocky Flats Plant still is in the process of implementing changes begun in the month of January to the data management system used for processing environmental samples. Total long-lived alpha and beta activity screening, which is performed on air effluent sample filters prior to radiochemical processing and analysis, is continuing on schedule. No unusual results have been seen in

this screening. Analytical results for all samples will be reported when available.

Ambient Air Monitoring Results

February 1992 Onsite Plutonium in Air Concentration for Sampling Location S-08 - The plutonium in air concentration (0.001290 ± 0.000208 pCi/m³) for the onsite S-08 location during the February 1992 sampling period (see page 10) was above levels typically measured for that location. The S-08 location is near the southeast inner security fence for the main Rocky Flats Plant building area (See map, page 14). Although concentrations at this level have been measured in the past for the S-08 location, their occurrence is infrequent - seven times from 1986 through 1991. For comparison, inhalation of plutonium at a concentration of 0.001290 pCi/m³ would result in a calculated effective dose equivalent of less than 0.2 mrem for an employee exposure occurring 8 hours per day, 5 days per week for 28 days. (Location S-08 is onsite, so the calculation was performed for a hypothetical employee exposure.) Naturally occurring radiation sources would contribute a radiation dose over 100 times greater than this during a 28-day period.

**February
1992**

Rocky Flats Plant Environmental Monitoring Report

Introduction

This report summarizes the effluent and environmental monitoring programs at the Rocky Flats Plant (RFP) for the month of February 1992. The data presented herein reflect the best information available to the RFP at this time. Should subsequent analyses indicate that any data presented herein are inaccurate or misleading, appropriate revisions will be issued promptly.

Tables 1 through 3 show monitoring results for radioactive and nonradioactive airborne effluents continuously sampled from plant buildings. Tables 4 through 6 summarize environmental monitoring data from the RFP ambient air sampling network. This network is comprised of continuously operating outdoor air samplers located on plantsite, around the plant boundary, and in neighboring communities.

Water sampling results for radioactive constituents are given in Tables 7 through 11. Results are summarized for plant surface water control ponds, for nearby drinking water reservoirs, and for tap water for neighboring communities. Nitrate monitoring for Great Western Reservoir and Standley Lake, the two drinking water reservoirs that can receive surface water discharges from the plant, are summarized in Table 12. Surface water discharges from RFP currently are being diverted around these drinking water reservoirs.

The Environmental Protection Agency (EPA) has issued to the plant a National Pollutant Discharge Elimination System (NPDES) permit for control of surface water discharges. Water sampling results associated with the NPDES permit, as modified by a March 25, 1991, Federal Facilities Compliance Agreement (FFCA) with EPA, are reported in Table 13. Applicable NPDES/FFCA limits are included in Table 13 for comparison. Monitoring results for which no limits have been established under the NPDES/FFCA are reported in Table 14. Appendix B

lists the volatile organic compounds for which monitoring is required under the NPDES/FFCA. Analytical results for nonradioactive parameters in water at the Walnut Creek at Indiana Street location are summarized in Table 15. Daily flow data for surface water from the two plant drainage systems (Walnut Creek and Woman Creek) are given in Tables 16 and 17. Daily flow data for water transferred from Pond B-5 to Pond A-4, for subsequent discharge offsite, are given in Table 18. Meteorological data are given in Tables 19 and 20.

Appendix D contains corrections and updates on previously reported information.

Error terms in the form of " $a \pm b$ " are included with some of the data. For a single sample, " a " is the analytical-blank corrected value; for multiple samples it represents the arithmetic mean, the volume-weighted mean, or the annual total, as indicated in the table. The error term " b " accounts for the propagated statistical counting uncertainty of the sample(s) and the associated analytical blanks at the 95 percent confidence level. These error terms represent a minimum estimate of error for the data.

Plutonium, uranium, americium, tritium, and beryllium measured concentrations are given in this report. Most of the measured concentrations are at or very near background levels, and often there is little or no amount of these materials in the media being analyzed. When this occurs, the results of the laboratory analyses can be expected to show a statistical distribution of positive and negative numbers near zero and numbers that are less than the calculated minimum detectable concentration for the analyses. The laboratory analytical blanks, used to correct for background contributions to the measurements, show a similar statistical distribution around their average values. Negative sample values result when the measured value for a laboratory analytical blank is subtracted from a sample analytical result smaller than the analytical blank value. Results that are less than calculated minimum detectable levels indicate that the results are below the level of statistical confidence in the actual numerical values. All reported results - including negative values and values that are less than minimum detectable levels - are included in any arithmetic calculations on the data set. Reporting all values allows all of the data to be evaluated using appropriate statistical treatment. This assists in identifying any

bias in the analyses, allows better evaluation of distributions and trends in environmental data, and helps in estimating the true sensitivity of the measurement process.

The reader should use caution in interpreting individual values that are negative or less than minimum detectable levels. A negative value has no physical significance. Values less than minimum detectable levels lack statistical confidence as to what the actual number is, although it is known with high confidence that it is below the specified detection level. Such values should not be interpreted as being the actual amount of material in the sample, but should be seen as reflecting a range (from zero to the minimum detectable level) in which the actual amount would likely lie. These values are significant, however, when taken together with other analytical results that indicate that the distribution is near zero.

The data provided in this report are provided as a matter of courtesy and should not be construed as an application for a permit or license, or in support of such an application. Approval of the Department of Energy should be obtained before publication of any data contained in this report.

Abbreviations used within this report are as defined.

Abbreviations

C Average	Average concentration
C Maximum	Maximum concentration
C Minimum	Minimum concentration
m ³	Cubic meter
m/s	Meters per second
mCi	Millicurie
mg/l	Milligrams per liter
mrem	Millirem
pCi/l	Picocuries per liter
pCi/m ³	Picocuries per cubic meter
pH	Hydrogen ion concentration
SU	Standard Unit
µg/m ³	Micrograms per cubic meter
#/100 ml	Number per 100 milliliter
µCi	Microcurie

Table 1**Plutonium and Americium Airborne Effluent Data**

	Plutonium-239, -240 (01/16/92 - 02/13/92)				Americium-241 (12/16/91 - 01/16/92)			
Month	Release (μ Cl)		C Maximum (pCl/m ³)		Release (μ Cl)		C Maximum (pCl/m ³)	
January	0.030	± 0.007	0.0005	± 0.0001	0.0075	± 0.0030	0.0006	± 0.0001
February	0.017	± 0.007	0.0002	± 0.0001	0.0076	± 0.0032	0.0001	± 0.0001
March	0.018	± 0.007	0.0001	± 0.0000	0.0008	± 0.0039	0.0001	± 0.0000
April	0.029	± 0.008	0.0001	± 0.0000	0.0046	± 0.0044	0.0000	± 0.0000
May	0.220	± 0.035	0.0030	± 0.0006	0.0070	± 0.0100	0.0002	± 0.0001
June	0.036	± 0.007	0.0001	± 0.0000	0.0093	± 0.0032	0.0000	± 0.0000
July	0.097	± 0.016	0.0009	± 0.0002	0.0221	± 0.0076	0.0002	± 0.0000
August	0.039	± 0.008	0.0003	± 0.0001	0.0092	± 0.0054	0.0001	± 0.0000
September	0.027	± 0.008	0.0002	± 0.0001	0.0080	± 0.0036	0.0000	± 0.0000
October	0.094	± 0.022	0.0003	± 0.0001	0.0307	± 0.0068	0.0000	± 0.0000
November	0.021	± 0.008 ^a	0.0007	± 0.0002	0.0075	± 0.0065 ^a	0.0001	± 0.0000
December	b		b		0.0288	± 0.0036 ^c	0.0008	± 0.0000
Year to Date	0.628	± 0.132	0.0030	± 0.0006	0.143		0.0006	± 0.0001
1992								
January	b		b		b		b	
February	b		b					

a Previously reported as incomplete data.

b Incomplete lab analysis.

c The data for one americium location is missing because of failure of Quality Assurance Criteria. The sample is being rerun.

Graph for plutonium is unavailable.

Table 2

Uranium Airborne Effluent Data

Month	Uranium-233, -234 (01/16/92 - 02/14/92)					Uranium-238 (01/16/92 - 02/14/92)				
	Release (μCi)			C Maximum (pCi/m^3)		Release (μCi)			C Maximum (pCi/m^3)	
January	0.003	±	0.013	0.0001	± 0.0001	0.020	±	0.013	0.0002	± 0.0001
February	0.004	±	0.013	0.0001	± 0.0000	0.001	±	0.011	0.0001	± 0.0000
March	0.026	±	0.021	0.0001	± 0.0001	0.033	±	0.012	0.0001	± 0.0000
April	0.036	±	0.013	0.0001	± 0.0001	0.039	±	0.012	0.0002	± 0.0001
May	0.143	±	0.029	0.0001	± 0.0001	0.163	±	0.030	0.0001	± 0.0001
June	0.127	±	0.023	0.0001	± 0.0001	0.147	±	0.021	0.0003	± 0.0001
July	0.080	±	0.018	0.0001	± 0.0001	0.119	±	0.018	0.0005	± 0.0002
August	0.032	±	0.019	0.0001	± 0.0001	0.076	±	0.019	0.0002	± 0.0001
September	0.041	±	0.019	0.0001	± 0.0001	0.063	±	0.020	0.0001	± 0.0001
October	0.079	±	0.031	0.0001	± 0.0001	0.173	±	0.034	0.0002	± 0.0001
November	0.041	±	0.017 ^a	0.0001	± 0.001	0.085	±	0.019	0.0002	± 0.0001
December	0.023	±	0.023 ^b	0.0001	± 0.0001	0.080	±	0.019 ^b	0.0002	± 0.0001
Year to Date	0.635	±	0.237	0.0001	± 0.0001	0.999			0.0005	± 0.0002
1992										
January	c			c		c			c	
February	c			c		c			c	

^a Previously reported as incomplete data.
^b The data for 11 uranium locations are missing because of failure of Quality Assurance Criteria. The samples are being rerun.
^c Incomplete lab analysis.

Graphs for uranium are unavailable.

Table 3

Tritium and Beryllium Airborne Effluent Data

	Tritium, H-3 (01/31/92 - 02/29/92)			Beryllium (01/16/92 - 02/14/92)		
Month	Release (mCi)	C Maximum (pCi/m ³)		Release (grams)	C Maximum (ug/m ³)	
January	0.082	19 ± 8		0.1468 ± 0.011	0.00059	
February	0.147	30 ± 18		0.1212 ± 0.009	0.00049	
March	0.179	27 ± 9		0.1051 ± 0.007	0.00032	
April	0.358	40 ± 17		0.1300 ± 0.008	0.00184	
May	0.121	21 ± 6		0.1016 ± 0.007	0.00043	
June	0.450	94 ± 55		0.2200 ± 0.014	0.00065	
July	0.857	68 ± 10		0.0893 ± 0.006	0.00034	
August	0.483	61 ± 13		0.0695 ± 0.004	0.00022	
September	0.330	46 ± 15		0.0802 ± 0.005	0.00062	
October	0.674	50 ± 8		0.0608 ± 0.004	0.00076	
November	0.479	92 ± 17		0.0629 ± 0.004	0.00029	
December	0.561	35 ± 16 ^a		0.4528 ± 0.034 ^a	0.00076	
Year to Date	4.721	94 ± 55		1.6403 ± 0.114	0.00184	
1992						
January		b		b		
February		b		b		

NOTE: Beryllium measured at the remaining 44 locations was below the screening level of 0.1 gram per month. Beryllium emissions from Rocky Flats Plant are regulated by the State of Colorado under Colorado Air Quality Control Regulation #8. The limit for beryllium air emissions is 10 grams per stationary source in a 24-hour period.

The calibration methodology for the beryllium analyses was changed beginning with the September 1990 samples to improve quality assurance. The previous procedure used the single-point, "simple method of additions," one of the methods recommended by the manufacturer of the graphite furnace atomic absorption analytical equipment. The current method is based on EPA Contract Laboratory Program protocol. It uses multi-point calibration curves, periodic validation of the curve with EPA validation standards, and periodic blank and sample checks to assure absence of equipment contamination and matrix effects during the analysis. No blank corrections are made to any beryllium data.

^a Previously reported as incomplete data.

^b Incomplete lab analysis.

Graphs for tritium and beryllium are unavailable.

Table 4**Plutonium Concentrations in Ambient Air for Onsite Samplers****(01/20/91 - 02/17/92)**

<u>Location</u>	<u>Number Composited Monthly Samples</u>	<u>Volume (m³)</u>	<u>Plutonium Concentration (pCi/m³)</u>	<u>± 95 percent Confidence Interval (pCi/m³)</u>
S-01a	1			
S-02	1	35000	0.000019	0.000005
S-03	1	28000	0.000005	0.000002
S-04	1	28000	0.000007	0.000003
S-05b	1			
S-06b	1			
S-07b	1			
S-08	1	30000	0.001290	0.000208
S-09b	1			
S-10	1	30000	0.000023	0.000006
S-11	1	30000	0.000007	0.000003
S-12b	1			
S-13b	1			
S-14	1	28000	0.000002	0.000002
S-15b	1			
S-16	1	32000	0.000003	0.000002
S-17	1	30000	0.000016	0.000005
S-18b	1			
S-19	1	30000	0.000110	0.000020
S-20	1	33000	0.000093	0.000021
S-21	1	21000	0.000021	0.000006
S-22	1	26000	0.000010	0.000004
S-23	1	32000	0.000008	0.000003
S-24	1	32000	0.000005	0.000002
S-25b	1			
S-81b	1			

a Sampler was inoperable during the sampling period.

b Incomplete lab analysis.

Table 5**Plutonium Concentrations in Ambient Air for Perimeter Samplers****(01/28/92 - 02/25/92)**

Location	Number Composited Monthly Samples	Volume (m³)	Plutonium Concentration (pCi/m³)	± 95 percent Confidence Interval (pCi/m³)
S-31 ^a				
S-32 ^a				
S-33 ^a				
S-34 ^a				
S-35 ^a				
S-36 ^a				
S-37 ^a				
S-38 ^a				
S-39 ^a				
S-40 ^a				
S-41 ^a				
S-42 ^a				
S-43 ^a				
S-44 ^a				

^a Incomplete lab analyses.

Table 6**Plutonium Concentrations in Ambient Air for Community Samplers****(01/29/92 - 02/26/92)**

<u>Location</u>	<u>Community Name</u>	<u>Number Composited Monthly Samples</u>	<u>Volume (m³)</u>	<u>Plutonium Concentration (pCi/m³)</u>	<u>± 95 percent Confidence Interval (pCi/m³)</u>
S-51a	Marshall				
S-52a	Jeffco Airport				
S-53a	Superior				
S-54a	Boulder				
S-55b	Lafayette				
S-56a	Broomfield				
S-57b	Walnut Creek				
S-58a	Wagner				
S-59a	Leyden				
S-60a	Westminster				
S-61c	Denver				
S-62a	Golden				
S-68a	Lakeview Pointe				
S-73a	Cotton Creek				

a Incomplete lab analyses.

b This sampler was damaged beyond repair and must be replaced.

c Sampler S-61 located in Denver was inoperative during this period. This sampler has been temporarily removed because of construction activities on the building where it is installed.

***Perimeter and Community Ambient Air Sampler
Graphs are unavailable.***

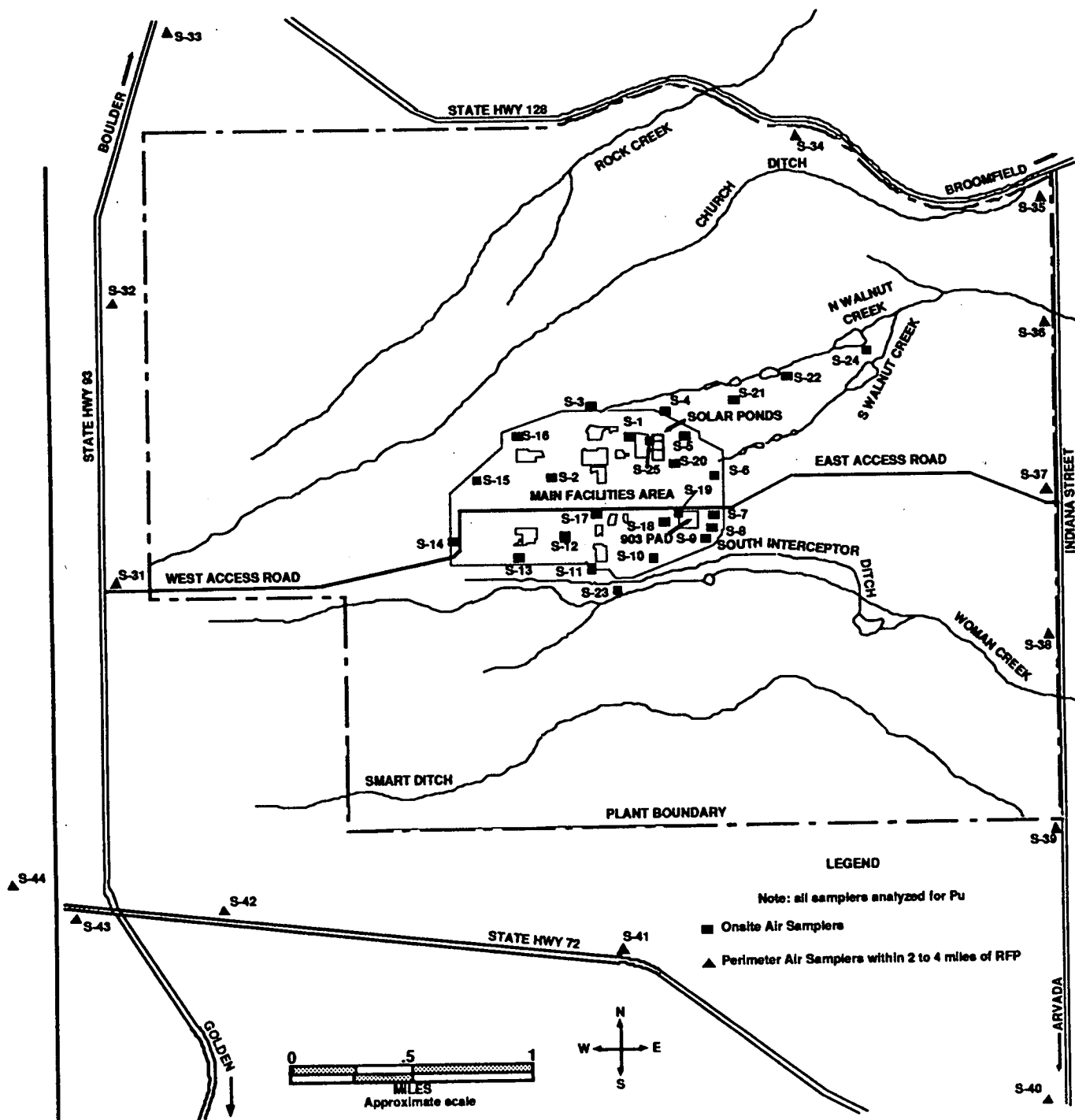


Figure 1: Location of Onsite and Perimeter Air Samplers

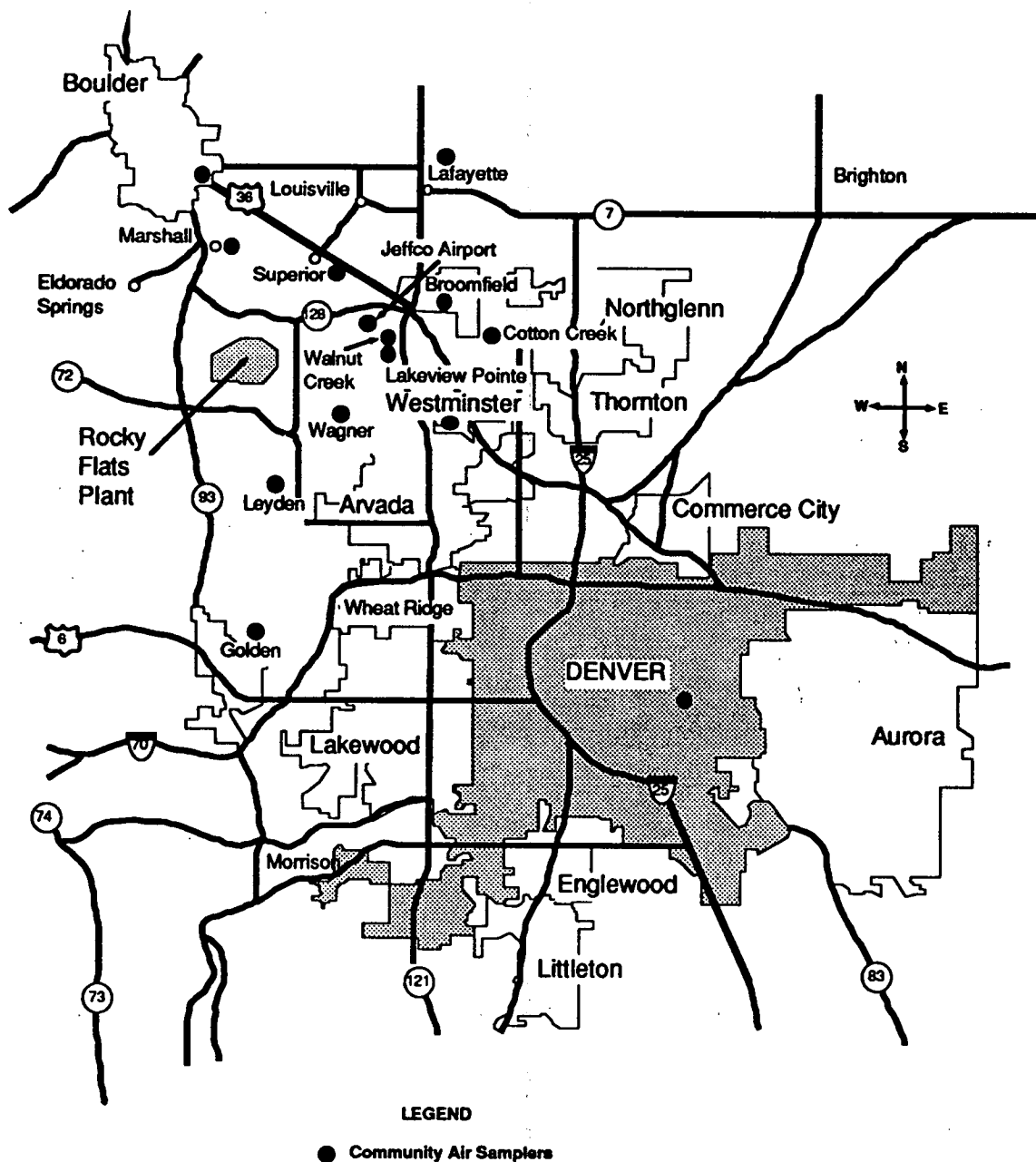


Figure 2: Location of Community Air Samplers

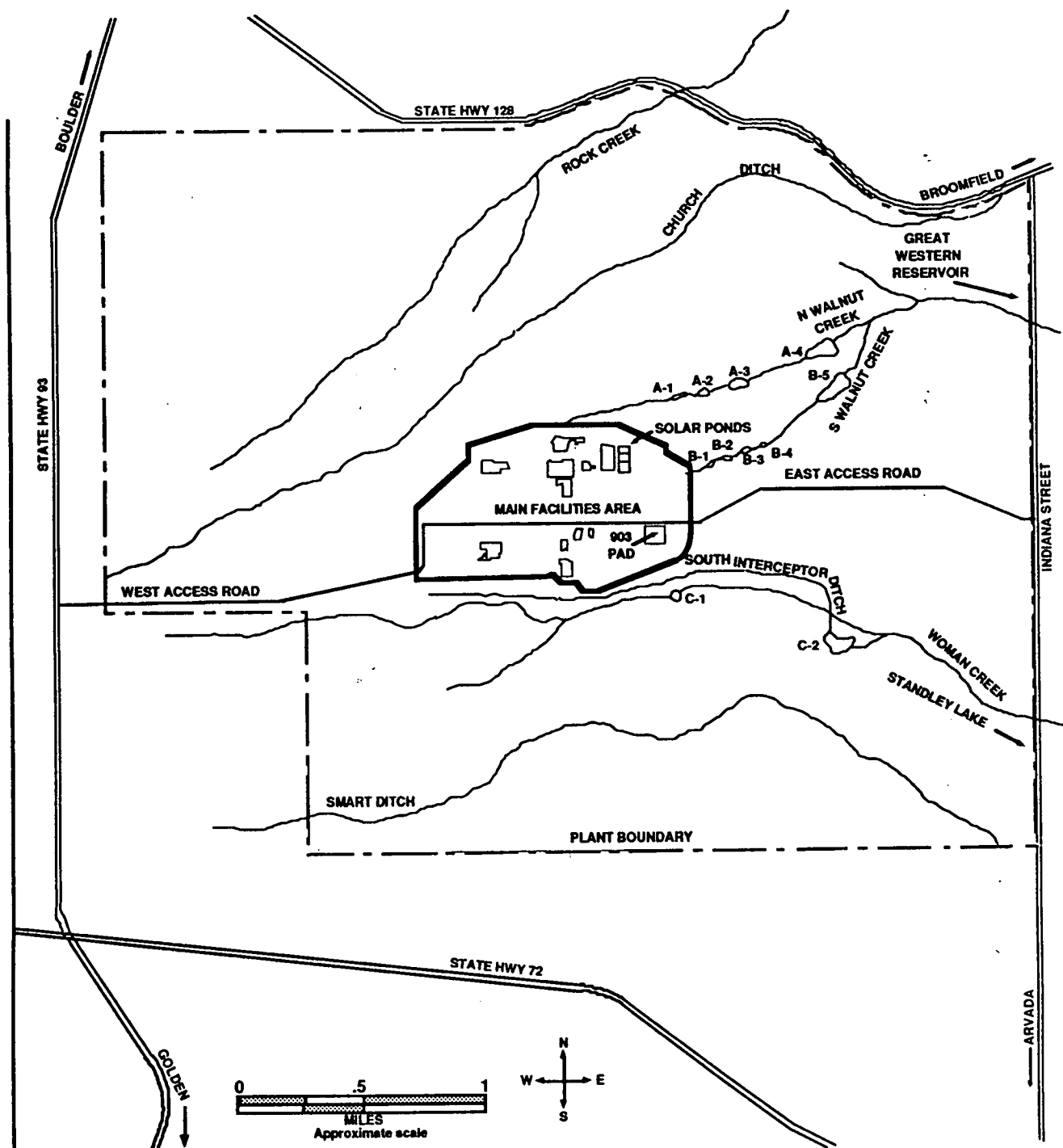
Table 7**Onsite Water Sample Results - Plutonium and Americium****Holding Pond Outfall (pCi/l)**

<u>Location</u>	<u>Plutonium-239, -240</u>			<u>Americium-241</u>	
<u>Pond A-4</u>					
02/15/92 - 02/21/92	a			a	
Volume weighted average concentration	a			a	
<u>Pond B-5</u> - No discharge.					
<u>Pond C-1</u>					
02/01/92 - 02/07/92	0.012	±	0.002	0.004	± 0.002
02/08/92 - 02/14/92	0.025	±	0.004	0.000	± 0.002
02/15/92 - 02/21/92	0.005	±	0.003	-0.002	± 0.002
02/22/92 - 02/28/92	a			a	
Average concentration	a			a	
<u>Pond C-2</u> - No discharge.					
<u>Walnut Creek at Indiana</u>					
02/16/92 - 02/22/92	0.000	±	0.001	-0.004	± 0.002
Volume weighted average concentration	0.000	±	0.001	-0.004	± 0.002

a Incomplete lab analysis.

Table 8**Onsite Water Sample Results - Uranium****Holding Pond Outfall (pCi/l)**

<u>Location</u>	<u>Uranium-233, -234</u>			<u>Uranium-238</u>		
<u>Pond A-4</u>						
02/15/92 - 02/21/92	a			a		
Volume weighted average concentration	a			a		
<u>Pond B-5</u> - No discharge.						
<u>Pond C-1</u>						
02/01/92 - 02/07/92	0.76	±	0.11	0.49	±	0.08
02/08/92 - 02/14/92	0.65	±	0.09	0.47	±	0.07
02/15/92 - 02/21/92	0.91	±	0.11	0.47	±	0.07
02/22/92 - 02/28/92	a			a		
Average concentration	a			a		
<u>Pond C-2</u> - No discharge.						
<u>Walnut Creek at Indiana</u>						
02/16/92 - 02/22/92	a			a		
Volume weighted average concentration	a			a		
a Incomplete lab analysis.						



Note: Stream flow in the Rocky Flats area is to the east.

Figure 3: Holding Pond and Liquid Effluent Water Courses

Plutonium graph for Pond A-4 is unavailable.

No discharge from Pond B-5 during 1992.

Plutonium graphs for Ponds C-1 and C-2 are unavailable.

Plutonium graph for Walnut Creek at Indiana Street is unavailable.

Table 9**Offsite Water Sample Results - Plutonium and Americium**

<u>Location</u>	<u>Number of Samples</u>	<u>Reservoirs (pCi/l)</u>	
		<u>Plutonium-239, -240</u>	<u>Americium-241</u>
Great Western	1a	b	b
Standley Lake	1a	b	b
<u>Community Tap Water (pCi/l)</u>			
Boulder	1a	b	b
Broomfield	1a	b	b
Westminster	1a	b	b

- a Plutonium and Americium analyses were performed on one sample composited from four weekly grab samples.
b Incomplete lab analysis.

Table 10**Offsite Water Sample Results - Uranium**

Reservoirs (pCi/l)			
<u>Location</u>	<u>Number of Samples</u>	<u>Uranium-233, -234</u>	<u>Uranium-238</u>
Great Western	1 ^a	b	b
Standley Lake	1 ^a	b	b
Community Tap Water (pCi/l)			
Boulder	1 ^a	b	b
Broomfield	1 ^a	b	b
Westminster	1 ^a	b	b

^a Uranium analyses were performed on one sample composited from four weekly grab samples.

^b Incomplete analysis.

Table 11**Onsite and Offsite Water Sample Results - Tritium**

Tritium (pCi/l)				
<u>Location</u>	<u>Number of Samples</u>	<u>C Minimum</u>	<u>C Maximum</u>	<u>C Average</u>
Pond A-4 ^a	7	-120 ± 200	190 ± 190	60 ± 80
Pond C-1	4	0 ± 170	170 ± 190	60 ± 190
Boulder	4	-220 ± 180	110 ± 180	-100 ± 180
Broomfield	4	-60 ± 190	60 ± 180	30 ± 180
Great Western	4	-240 ± 180	230 ± 190	-60 ± 180
Standley Lake	4	-160 ± 190	120 ± 200	-20 ± 190
Westminster	4	-180 ± 190	50 ± 180	-100 ± 180
Walnut at Indiana ^a	6	-10 ± 180	150 ± 190	60 ± 80

^a Volume weighted average concentration.

^b Incomplete lab analysis.

Table 12**Offsite Water Sample Results - Nitrate as Nitrogen****Nitrate (as N) at Great Western Reservoir**

<u>Sample Date</u>	<u>Nitrate (as N) (mg/l)</u>
02/06/92	0.03
02/13/92	0.03
02/20/92	0.04
02/24/92	0.05

Nitrate (as N) at Standley Lake

02/06/92	<0.02
02/13/92	<0.02
02/20/92	0.03
02/24/92	0.03

Note: For some nonradioactive parameters, the concentrations that are measured at or below the minimum detectable concentration (MDC) are assigned to MDC. The less than symbol (<) indicates MDC values and calculated values that include one or more MDCs.

Table 13

NPDES/FFCA Permit Water Sample Results

Discharge 001-A (Pond B-3) Discharged continuously 02/01/92 through 02/29/92.

<u>Parameters</u>		<u>Measured 30-Day Average</u>	<u>Limit 30-Day Average</u>	<u>Measured Max. 7-Day Average</u>	<u>Limit Max. 7-Day Average</u>
Nitrate	mg/l	5.9	10	6.2	20
Total Residual Chlorine	mg/l		<u>Measured Maximum</u> 0.27	<u>Limit Maximum</u> 0.5	

Discharge 001-B (Sewage Treatment Plant) Discharged continuously 02/01/92 through 02/29/92.

<u>Parameters</u>		<u>Measured 30-Day Average</u>	<u>Limit 30-Day Average</u>	<u>Measured Maximum</u>	<u>Limit Maximum</u>
CBOD5	mg/l	3	10	9	25
Total Phosphorus	mg/l	0.11	8	0.23	12
Total Chromium	mg/l	0.005	0.05	0.006	0.10
Fecal Coliforms	#/100 ml	<u>Measured 30-Day Average</u> 1 (Geometric)	<u>Limit 30-Day Average</u> 200 (Geometric)	<u>Measured Max. 7-Day Average</u> 2 (Geometric)	<u>Limit Max. 7-Day Average</u> 400 (Geometric)
Total Suspended Solids	mg/l	2.5	30	4.3	45
pH	SU	<u>Measured Minimum</u> 6.5	<u>Limit Minimum</u> 6.0	<u>Measured Maximum</u> 7.1	<u>Limit Maximum</u> 9.0
Oil and Grease		<u>Observed Sheen</u> no visual	<u>Limit Sheen</u> no visual		

Discharge 002 (Pond A-3) Discharged continuously 02/22/92 through 02/27/92.

<u>Parameters</u>		<u>Measured 30-Day Average</u>	<u>Limit 30-Day Average</u>	<u>Measured Maximum</u>	<u>Limit Maximum</u>
Nitrates as N	mg/l	3.6	10	3.8	20
pH	SU	<u>Measured Minimum</u> 8.3	<u>Limit Minimum</u> 6.0	<u>Measured Maximum</u> 8.5	<u>Limit Maximum</u> 9.0

Table 13

NPDES/FFCA Permit Water Sample Results (Continued)

Discharge 003 (RO Pilot Plant) and Discharge 004 (RO Plant) are inactive outfalls and will be eliminated from the new NPDES permit.

Discharge 005 (Pond A-4) Discharged continuously 02/15/92 through 02/21/92.

<u>Parameters</u>		<u>Measured Maximum</u>	<u>Limit Maximum</u>
Total Chromium	mg/l	<0.005	0.05

Discharge 006 (Pond B-5) No discharge.

<u>Parameters</u>		<u>Measured 30-Day Average</u>	<u>Limit 30-Day Average</u>	<u>Measured Max. 7-Day Maximum</u>	<u>Limit Max. 7-Day Maximum</u>
Nitrate as Na	mg/l		10		20
			<u>Measured Maximum</u>	<u>Limit Maximum</u>	
Total Residual Chlorine ^a	mg/l			0.5	
Total Chromium	mg/l			0.05	

Discharge 007 (Pond C-2) No discharge.

<u>Parameters</u>		<u>Measured Maximum</u>	<u>Limit Maximum</u>
Total Chromium	mg/l		0.05

^a These parameters are measured only in the event that Waste Water Treatment Plant effluent bypasses Pond B-3 and flows directly into Pond B-5.

Table 14

NPDES/FFCA Effluent Monitoring

Discharge 001-A (Pond B-3) Discharged continuously 02/01/92 through 02/29/92.

<u>Parameters</u>		<u>Measured Maximum</u>	<u>Measured 30-Day Average</u>
BOD5	mg/l	4	2.7
CBOD5	mg/l	2	1.2
Total Suspended Solids	mg/l	10	7

Discharge 001-B (Sewage Treatment Plant [STP]) Discharged continuously 02/01/92 through 02/29/92.

<u>Parameters</u>		<u>Measured Maximum</u>	<u>Measured 30-Day Average</u>
Nitrate as N	mg/l	8.15	6.05
Total Residual Chlorine	mg/l	0.03	0.01

Whole Effluent Toxicity^a Sampled quarterly; data reported December 1991
 Ceriodaphnia % Eff to LC50:
 Fathead Minnows % Eff to LC50:

		<u>Measured 30-Day Average</u>
Metals		
Antimony	ug/l	<21
Arsenic	ug/l	<1.0
Beryllium	ug/l	<1
Cadmium	ug/l	<0.28
Copper	ug/l	<5.2
Iron	ug/l	154
Lead	ug/l	4.3
Manganese	ug/l	28.3
Mercury	ug/l	<0.2
Nickel	ug/l	<18
Silver	ug/l	<0.2
Zinc	ug/l	61.5

Metals were sampled on 02/05/92 and 02/12/92.

		<u>PQL^b</u>	<u>Concentrations that were above PQL</u>	
Volatile Organic Compounds (VOCs)	ug/l	5 ug/l	10 ug/l	sample date 02/10/92
Chloroform				

Table 14

NPDES/FFCA Effluent Monitoring (Continued)

Discharge 003 (Reverse Osmosis Pilot Plant) and Discharge 004 (Reverse Osmosis Plant) are inactive outfalls and will be eliminated from the new NPDES permit.

Discharge 005 (Pond A-4) Discharged continuously 02/15/92 through 02/21/92

Whole Effluent Toxicity^a Sampled quarterly; data reported December 1991

Ceriodaphnia	% Eff to LC50:
Fathead Minnows	% Eff to LC50:

Discharge 006 (Pond B-5) No discharge.

Whole Effluent Toxicity^a

Ceriodaphnia	% Eff to LC50:
Fathead Minnows	% Eff to LC50:

Discharge 007 (Pond C-2) No discharge.

Whole Effluent Toxicity^a

Ceriodaphnia	% Eff to LC50:
Fathead Minnows	% Eff to LC50:

- ^a Results for whole effluent toxicity are given in percentage of effluent sample that will cause mortality to half the test result organisms within the time frame of the test. For example, >100 percent indicates that 100 percent pure effluent did not cause acute toxicity to at least half of the organisms. A lower percentage LC₅₀ (lethal concentration to 50 percent of test organisms) indicates a greater toxic effect since less of the sample is required to observe a sufficiently extensive adverse effect.
- ^b PQL is the Practical Quantitation Limit. It is equal to ten times the Method Detection Limit and represents the quantity at which 70 percent of laboratories can report in the 95 percent confidence interval.

Table 15**Water Sample Results, Nonradioactive Parameters****Walnut Creek at Indiana Street**

<u>Parameters</u>		<u>Number of Samples</u>	<u>C Minimum</u>	<u>C Maximum</u>	<u>C Average</u>
pH	SU	7	7.78	8.13	N/A
Nitrites as N	mg/l	7	2.29	3.29	2.96

Flow occurred from 02/16/92 through 02/22/92.

Table 16**Daily Flow Data Recorded at the Walnut Creek at Indiana Gaging Station, Ponds A-4 and B-5**

<u>Date</u>	<u>Walnut Creek at Indiana (Gallons)</u>	<u>Pond A-4 (Gallons)</u>	<u>Pond B-5 (Gallons)</u>
02/01/92	No flow	No discharge	No discharge
02/02/92			
02/03/92			
02/04/92			
02/05/92			
02/06/92			
02/07/92			
02/08/92			
02/09/92			
02/10/92			
02/11/92			
02/12/92			
02/13/92			
02/14/92		No discharge	
02/15/92	No flow	9,000	
02/16/92	533,000	803,000	
02/17/92	485,000	776,000	
02/18/92	662,000	942,000	
02/19/92	818,000	876,000	
02/20/92	869,000	940,000	
02/21/92	908,000	964,000	
02/22/92	62,000	No discharge	
02/23/92	No flow		
02/24/92			
02/25/92			
02/26/92			
02/27/92			
02/28/92			
02/29/92	No flow	No discharge	No discharge
Total	4,337,000	5,310,000	No discharge

Table 17**Daily Flow Data Recorded at Ponds C-1 and C-2 (Woman Creek)**

<u>Date</u>	<u>Pond C-1 (Gallons)</u>	<u>Pond C-2 (Gallons)</u>
02/01/92	303,000	No discharge
02/02/92	275,000	
02/03/92	256,000	
02/04/92	219,000	
02/05/92	197,000	
02/06/92	200,000	
02/07/92	186,000	
02/08/92	192,000	
02/09/92	217,000	
02/10/92	224,000	
02/11/92	230,000	
02/12/92	241,000	
02/13/92	219,000	
02/14/92	221,000	
02/15/92	192,000	
02/16/92	186,000	
02/17/92	168,000	
02/18/92	138,000	
02/19/92	139,000	
02/20/92	169,000	
02/21/92	191,000	
02/22/92	182,000	
02/23/92	182,000	
02/24/92	172,000	
02/25/92	184,000	
02/26/92	178,000	
02/27/92	169,000	
02/28/92	170,000	
02/29/92	158,000	No discharge
Total	5,758,000	No discharge

Table 18**Daily Transfer Flow Data Recorded for Pond B-5 to Pond A-4**

<u>Date</u>	<u>Pond B-5 to Pond A-4 (gallons)</u>
02/01/92	No transfer
02/02/92	
02/03/92	
02/04/92	
02/05/92	
02/06/92	
02/07/92	
02/08/92	
02/09/92	
02/10/92	
02/11/92	
02/12/92	
02/13/92	
02/14/92	
02/15/92	
02/16/92	
02/17/92	
02/18/92	
02/19/92	
02/20/92	No transfer
02/21/92	285,800
02/22/92	1,071,500
02/23/92	1,074,100
02/24/92	1,033,000
02/25/92	1,023,600
02/26/92	1,029,000
02/27/92	942,300
02/28/92	925,400
02/29/92	455,600
Total	7,840,300

Site Meteorology and Climatology

Meteorological data were collected on the plantsite during February 1992 from instrumentation installed on a 61-meter (200-foot) tower located in the west buffer zone. Meteorological information in this report represents over 100 percent data recovery. Table 19 is the February 1992 summary of the percent frequency of wind directions (16 compass points) divided into four wind-speed categories. The compass point designations indicate the true bearing when facing against the wind. These frequency values are represented graphically in the accompanying wind rose. The wind rose vectors also represent the bearing against the wind (i.e., wind along each vector blows toward the center).

The high frequency of winds with a westerly component is normal at the RFP (when there are no strong synoptic systems). The low frequency of winds greater than 7 meters per second (m/s) (15.6 mph) with easterly components is also normal.

February weather was mild, dry, and windy, with winds especially strong during the third week. Strong, large-scale winds from the west through northwest during much of the month dried and warmed the air as it descended from the foothills. February was marked by a lack of cold high pressure systems located over the U.S. Northern Plains. These systems can cause cold and strong upslope winds from the northeast that produce snow. This fact is well represented in the temperatures and precipitation noted in Table 20.

The mean wind speed for February 1992 was 4.3 m/s (9.6 mph). The highest wind gust was 24 m/s (54 mph), which occurred during a chinook wind event on February 18 at approximately 8:30 a.m.

The mean temperature recorded for February 1992 was 4.0 °C (39.2 °F). The maximum temperature recorded was 17.1 °C (62.7 °F), which occurred on the last day of the month. The minimum temperature recorded was 6.1 °C (21.0 °F) on February 5, 1992, at approximately 5:45 a.m.

The RFP recorded 0.06 centimeters (0.02 inches) of precipitation for the month of February 1992. The maximum precipitation for a 15-minute period was undetermined, but it was equal to or less than 0.06 centimeters (0.02 inches). All measurable precipitation fell on February 23, 1992.

Table 19

Rocky Flats Plant Wind Direction Frequency (Percent) by Four Wind-Speed Classes

(Fifteen-Minute Averages - February 1992)

	<u>Calm</u>	<u>1-3</u> <u>(m/s)</u>	<u>3-7</u> <u>(m/s)</u>	<u>7-15</u> <u>(m/s)</u>	<u>> 15</u> <u>(m/s)</u>	<u>Total</u>
-	1.19	-	-	-	-	1.19
N	-	2.44	3.48	0.07	0.00	6.18
NNE	-	2.05	2.12	0.57	0.00	4.78
NE	-	1.62	1.76	1.01	0.00	4.49
ENE	-	1.51	0.79	0.00	0.00	2.37
E	-	2.55	0.40	0.00	0.00	2.95
ESE	-	1.94	0.97	0.00	0.00	2.98
SE	-	2.73	1.29	0.00	0.00	4.02
SSE	-	2.33	1.62	0.00	0.00	4.02
S	-	2.08	1.26	0.00	0.00	3.41
SSW	-	2.23	1.08	0.00	0.00	3.34
SW	-	3.12	2.19	0.07	0.00	5.46
WSW	-	2.51	3.20	0.57	0.00	6.47
W	-	4.27	3.41	2.59	0.00	10.34
WNW	-	3.45	6.21	8.58	0.22	18.50
NW	-	3.81	6.11	2.48	0.04	12.50
NNW	-	3.38	4.45	0.25	0.00	8.19
Totals	1.19	42.03	40.34	16.20	0.25	100.00

Table 20

Climatic Summary

TEMPERATURE AND DEWPOINT					WIND DATA		PRECIPITATION	PRESSURE	
Date	High (°F)	Low	Mean	Dew- point	Mean (mph)	Maximum (1 sec)	Maximum (15 min)	Total Inches	Actual Mean (Millibars)
02/01/92	53.1	36.0	45.9	9.8	6.0	14.8	0	0	811.2
02/02/92	53.3	33.7	44.4	12.7	6.9	23.6	0	0	810.7
02/03/92	38.2	29.8	35.1	16.4	7.8	23.3	0	0	817.4
02/04/92	36.0	21.5	29.5	15.3	5.8	13.5	0	0	816.9
02/05/92	38.6	21.0	31.7	7.8	6.0	27.6	0	0	810.0
02/06/92	45.2	27.6	36.0	9.9	6.6	15.1	0	0	811.1
02/07/92	40.9	27.1	33.4	11.5	5.6	12.8	0	0	808.8
02/08/92	42.9	21.4	31.3	19.6	4.8	19.7	0	0	805.4
02/09/92	49.2	27.4	40.0	20.0	9.9	34.4	0	0	805.2
02/10/92	46.0	28.2	36.9	21.2	5.6	17.5	0	0	808.9
02/11/92	43.5	26.3	34.3	24.6	5.8	15.8	0	0	809.5
02/12/92	49.3	24.1	37.1	20.4	7.4	38.7	0	0	809.1
02/13/92	47.0	26.1	38.9	18.7	5.6	12.7	0	0	803.8
02/14/92	46.2	31.8	39.1	17.8	12.6	42.7	0	0	801.9
02/15/92	47.9	31.6	40.3	13.1	10.1	30.8	0	0	806.1
02/16/92	42.1	28.1	36.6	13.0	8.3	18.8	0	0	800.5
02/17/92	39.2	29.5	34.2	6.8	27.6	52.8	0	0	803.3
02/18/92	40.0	27.8	33.3	4.4	21.5	54.0	0	0	810.8
02/19/92	49.0	29.5	41.2	10.6	17.5	47.5	0	0	811.7
02/20/92	54.5	42.5	48.0	21.3	12.5	42.6	0	0	809.6
02/21/92	54.5	37.0	46.6	20.3	13.5	41.2	0	0	812.1
02/22/92	50.0	32.5	43.2	19.8	5.1	27.8	0	0	811.1
02/23/92	42.7	23.8	34.6	21.3	11.3	38.9	-999	0.02	812.3
02/24/92	45.4	21.1	34.7	13.3	6.8	20.0	0	0	815.7
02/25/92	41.4	28.8	34.2	17.3	8.5	24.3	0	0	818.4
02/26/92	52.7	28.0	42.1	15.7	9.7	25.0	0	0	817.9
02/27/92	57.3	41.2	49.0	21.1	10.0	24.0	0	0	818.5
02/28/92	60.8	39.7	52.5	15.3	9.7	30.2	0	0	816.8
02/29/92	62.7	40.7	52.0	12.7	9.5	30.9	0	0	813.3

MONTHLY TEMPERATURES				WIND DATA		PRECIPITATION	PRESSURE	
Mean High (°F)	Mean Low	Mean	Mean Dew- point	Mean (mph)	Monthly Maximum	Monthly Maximum	Total	Monthly Average
47.2	29.8	39.2	39.2	9.6	54.0	-999	0.02	810.6

Appendix A

Radiation Standards for Protection of the Public

Calculation of Potential Plant Contribution to Public Radiation Dose

The primary standards for protection of the public from radiation are based on radiation dose. Radiation dose is a means of quantifying the biological damage or risk of ionizing radiation. The unit of radiation dose is the rem or the millirem (1 rem = 1,000 mrem). Radiation protection standards for the public are annual standards, based on the projected radiation dose from a year's exposure to or intake of radioactive materials.

Radiation dose is a calculated value. It is calculated by multiplying radioactivity concentrations in air and water or on contaminated surfaces by assumed intake rates (for internal exposures) or by exposure times (for external exposure to penetrating radiation), then by the appropriate radiation dose conversion factors. That is:

$$\text{Radiation Dose} = \frac{\text{Radioactivity Concentration} \times \text{Intake Rate/Exposure Time} \times \text{Dose Conversion Factor}}{1}$$

Radioactivity concentrations can be determined either by measurements in the environment or by calculations using computer models. These computer models perform airborne dispersion/dose modeling of measured building radioactivity effluents and estimated diffuse source term emissions (e.g., from resuspension from contaminated soil areas).

Assumed intake rates and dose conversion factors used are based on recommendations of national and international radiation protection advisory organizations, such as the National Council on Radiation Protection and Measurements (NCRP) and the International Commission on Radiological Protection (ICRP).

Radioactive materials of importance in calculating radiation dose to the public from Rocky Flats Plant (RFP) activities include plutonium, uranium, americium, and tritium. Alpha radiation emissions from plutonium, uranium, and americium are primary contributors to the projected radiation dose.

DOE Radiation Protection Standards for the Public

ICRP-Recommended Standards for all Pathways:

Temporary Increase - 500 mrem/year
Effective Dose Equivalent
(with prior approval of DOE EH-2)

Normal Operations - 100 mrem/year
Effective Dose Equivalent

EPA Clean Air Act Standards for the Air Pathway Only:

10 mrem-year Effective Dose
Equivalent

DOE Derived Concentration Guides for Radionuclides of Interest at the Rocky Flats Plant

Air Inhalation:

Radionuclide	DCG (pCi/m ³)
Plutonium-239, -240	0.02

Water Ingestion:

Radionuclide	DCG (pCi/l)
Plutonium-239, -240	30
Americium-241	30
Uranium-233, -234	500
Uranium-238	600
Hydrogen-3 (Tritium)	2,000,000

Potential public radiation dose commitments, which could have resulted from plant operations and from background (i.e., non-Plant) contributions, are calculated from average radionuclide concentrations measured at the Department of Energy (DOE) property boundary and in surrounding communities. Inhalation and water ingestion are the principal potential pathways of human exposure.

On February 8, 1990, DOE adopted DOE Order 5400.5, "Radiation Protection of the Public and the Environment," a radiation protection standard for DOE environmental activities (US 90). This standard incorporates guidance from the International Commission on Radiological Protection (ICRP), as well as from the Environmental Protection Agency Clean Air Act air emission standards (as implemented in 40 CFR 61, Subpart H). Included in DOE Order 5400.5 is a revision of the dose limits for members of the public. Tables of radiation dose conversion factors currently used for calculating dose from intakes of radioactive materials were issued in July 1988 (US88a, US88b). The dose factors are based on the ICRP Publications 30 and 48 methodology and biological models for radiation dosimetry. The DOE Order 5400.5 and the dose conversion factor tables are used for assessment of any potential RFP contribution to public radiation dose. On December 15, 1989, EPA published revised Clean Air Act air emission standards for DOE facilities (US89). DOE radiation standards for protection of the public are given in this Appendix and include the December 15, 1989, EPA Clean Air Act air pathway standards.

DOE Derived Concentration Guides

Secondary radioactivity concentration guides can be calculated from the primary radiation dose standards and used as comparison values for measured radioactivity concentrations. DOE provides tables of these "Derived Concentration Guides" - in Order 5400.5. Derived Concentration Guides (DCGs) are the concentrations that would result in an effective dose equivalent of 100 mrem from one year's chronic exposure or intake. In calculating air inhalation DCGs, DOE assumes that the exposed individual inhales 8,400 cubic meters of air at the calculated DCG during the year. Ingestion DCGs

**Compliance with EPA
Clean Air Act Standards**

assume a water intake of 730 liters at the calculated DCG for the year. The table on page 40 lists the most restrictive air and water DCGs for the principal radionuclides of interest at the RFP.

To determine compliance with the EPA air emissions standards, measured airborne effluent radioactivity emissions are entered into the EPA-approved atmospheric dispersion/dose calculation computer model, AIRDOS-PC, for calculation of the maximum radiation dose that an individual in the public could receive from the air pathway only.

For comparison with the annual radiation dose standards for protection of the public, the maximum annual effective dose equivalent that a member of the public could receive as a result of RFP activities is typically less than 1 mrem, or less than 1 percent of the recommended annual standard for all pathways.

Dose Equivalent and Effective Dose Equivalent

Dose equivalent is a calculated value used to quantify radiation dose; it reflects the degree of biological effect from ionizing radiation. Differences in the biological effect of different types of ionizing radiation (e.g., alpha, beta, gamma, or x-rays) are accounted for in the calculation of dose equivalent.

Effective dose equivalent is a calculated value used to allow comparisons of total health risk (based primarily on the risk of cancer mortality) from exposures of different types of ionizing radiation to different body organs. It is calculated by first calculating the dose equivalent to those organs receiving significant exposures, multiplying each organ dose equivalent by a health risk weighting factor, and then summing those products. One millirem effective dose equivalent from natural background radiation would have the same health risk as one millirem effective dose equivalent from an artificially produced source of radiation.

References

US88a DOE/EH-0070, "External Dose-Rate Conversion Factors for Calculation of Dose to the Public," United States Department of Energy, Asst. Secretary for Environment, Safety and Health, July 1988.

US88b DOE/EH-0071, "Internal Dose Conversion Factors for Calculation of Dose to the Public," United States Department of Energy, Asst. Secretary of Environment, Safety and Health, July 1988.

US89 United States Environmental Protection Agency, Code of Federal Regulations 40 CFR 61, Subpart H, "National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities," Washington, D.C., December 15, 1989.

US90 United States Department of Energy, DOE Order 5400.5, "Radiation Protection of the Public and the Environment," Washington, D.C., February 8, 1990.

Appendix B

National Pollution Discharge Elimination System/Federal Facilities Compliance Agreement Volatile Organic Compounds

The following is a list of volatile organic compounds (VOCs) for which monitoring is required by the Environmental Protection Agency National Pollution Discharge Elimination System/Federal Facilities Compliance Agreement (NPDES/FFCA).

<u>Compound</u>	<u>PQL (ug/l)</u>	<u>Compound</u>	<u>PQL (ug/l)</u>
Benzene	5	1,3-dichloropropylene	5
Bromoform	5	Ethylbenzene	5
Methyl bromide	10	Methyl chloride	10
Carbon Tetrachloride	5	Methylene chloride	5
Chlorobenzene	5	1,1,2,2-tetrachloroethane	5
Chlorodibromomethane	5	Tetrachloroethylene	5
Chloroethane	10	Toluene	5
Chloroform	5	1,2-trans-dichloroethylene	5
Dichlorobromomethane	5	1,1,1-trichloroethane	5
1,1-dichloroethane	5	1,1,2-trichloroethane	5
1,2-dichloroethane	5	Trichloroethylene	5
1,1-dichloroethylene	5	Vinyl chloride	10
1,2-dichloropropane	5		

Appendix C

Colorado Water Quality Control Commission Standards

The Colorado Water Quality Control Commission has promulgated new standards for the Walnut Creek and Woman Creek drainages downstream from the Rocky Flats Plant. The Environmental Protection Agency has not yet written a new National Pollutant Discharge Elimination System permit that reflects these standards; however, in the spirit of the Agreement in Principle completed between the Department of Energy and the State of Colorado, the plant is attempting to meet the standards at this time.

Appendix D

***Corrections and Updates
for previously reported information***

Table 4 - Errata November 1991

Plutonium Concentrations in Ambient Air for Onsite Samplers

(10/28/91 - 11/25/91)

Location	Number Composited Monthly Samples	Volume (m³)	Plutonium Concentration (pCi/m³)	± 95 percent Confidence Interval (pCi/m³)
S-01a	1	34000	0.000156	0.000031
S-02	1	35000	0.000005	0.000003
S-03	1	29000	0.000000	0.000002
S-04	1	27000	0.000004	0.000003
S-05	1	35000	0.000013	0.000004
S-06	1	33000	0.000010	0.000003
S-07	1	29000	0.000012	0.000004
S-08b	1	34000	0.000037	0.000008
S-09	1	33000	0.000016	0.000005
S-10	1	32000	0.000004	0.000003
S-11	1	32000	0.000001	0.000002
S-12c				
S-13	1	33000	0.000002	0.000002
S-14	1	30000	0.000002	0.000003
S-15c				
S-16	1	32000	0.000001	0.000002
S-17d	1			
S-18	1	33000	0.000008	0.000003
S-19	1	32000	0.000054	0.000011
S-20	1	35000	0.000012	0.000004
S-21	1	34000	0.000007	0.000003
S-22	1	27000	0.000002	0.000003
S-23a	1	33000	0.000001	0.000002
S-24	1	34000	0.000001	0.000002
S-25	1	30000	0.000041	0.000009
S-81	1	30000	0.000006	0.000004

a Previously reported data was miscalculated.

b Previously reported as incomplete lab analysis.

c These samplers were removed from the RAAMP network and will be used at the new community operated monitoring stations.

d Sampler was inoperable during the sampling period; previously reported data were based on insufficient sampling volume.

Table 5 - Errata November 1991**Plutonium Concentrations in Ambient Air for Perimeter Samplers****(10/22/91 - 11/19/91)**

Location	Number Composited Monthly Samples	Volume (m³)	Plutonium Concentration (pCi/m³)	± 95 percent Confidence Interval (pCi/m³)
S-31a	1			
S-32	1	35000	-0.000001	0.000001
S-33	1	33000	0.000001	0.000002
S-34	1	32000	0.000000	0.000001
S-35	1	31000	0.000000	0.000002
S-36	1	34000	-0.000001	0.000002
S-37	1	33000	0.000003	0.000002
S-38	1	31000	0.000000	0.000001
S-39	1	33000	0.000002	0.000002
S-40	1	35000	0.000000	0.000001
S-41	1	33000	0.000000	0.000001
S-42	1	31000	0.000000	0.000001
S-43	1	32000	-0.000001	0.000001
S-44	1	31000	0.000000	0.000001

^a Sample was lost during lab analyses.

Table 4 - Errata December 1991

Plutonium Concentrations in Ambient Air for Onsite Samplers

(11/25/91 - 12/23/91)

Location	Number Composited Monthly Samples	Volume (m³)	Plutonium Concentration (pCi/m³)	± 95 percent Confidence Interval (pCi/m³)
S-01 ^a				
S-02	1	35000	0.000007	0.000003
S-03	1	29000	0.000002	0.000002
S-04	1	27000	0.000006	0.000003
S-05	1	31000	0.000027	0.000013
S-06	1	32000	0.000175	0.000028
S-07	1	29000	0.000044	0.000009
S-08	1	33000	0.000091	0.000016
S-09 ^b	1	32000	0.000071	0.000014
S-10	1	31000	0.000006	0.000006
S-11	1	31000	0.000009	0.000003
S-12 ^c				
S-13	1	32000	0.000003	0.000002
S-14	1	29000	0.000001	0.000002
S-15 ^c				
S-16	1	32000	0.000000	0.000002
S-17 ^a	1			
S-18	1	31000	0.000050	0.000010
S-19 ^b	1	30000	0.000037	0.000007
S-20	1	31000	0.000012	0.000004
S-21	1	34000	0.000009	0.000003
S-22	1	28000	0.000003	0.000002
S-23	1	32000	0.000004	0.000003
S-24	1	34000	0.000001	0.000002
S-25 ^d	1	22000	0.000132	0.000024
S-81 ^a	1			

^a Sampler was inoperable during the sampling period.

^b Previously reported as incomplete lab analyses.

^c These samplers were removed from the RAAMP network and will be used at the new community operated monitoring stations.

^d Sampler was inoperable during part of the sampling period.

Table 5 - Errata December 1991**Plutonium Concentrations in Ambient Air for Perimeter Samplers****(11/19/91 - 12/17/91)**

Location	Number Composited Monthly Samples	Volume (m³)	Plutonium Concentration (pCi/m³)	± 95 percent Confidence Interval (pCi/m³)
S-31	1	34000	0.000000	0.000001
S-32	1	34000	0.000000	0.000001
S-33	1	33000	0.000000	0.000001
S-34 ^a	1	32000	0.000000	0.000001
S-35 ^a	1	31000	0.000000	0.000001
S-36	1	33000	0.000001	0.000001
S-37 ^a	1	33000	0.000003	0.000002
S-38 ^a	1	31000	0.000001	0.000002
S-39	1	32000	0.000000	0.000001
S-40	1	34000	0.000002	0.000002
S-41	1	33000	0.000000	0.000001
S-42	1	30000	0.000001	0.000002
S-43	1	32000	0.000003	0.000002
S-44	1	31000	-0.000001	0.000001

^a Previously reported as incomplete lab analyses.

Table 4 - Errata January 1991

Plutonium Concentrations in Ambient Air for Onsite Samplers

(12/23/91 - 1/20/92)

Location	Number Composited Monthly Samples	Volume (m³)	Plutonium Concentration (pCi/m³)	± 95 percent Confidence Interval (pCi/m³)
S-01 ^a	1	18000	0.000183	0.000017
S-02	1	36000	0.000002	0.000001
S-03	1	28000	0.000002	0.000001
S-04	1	28000	0.000002	0.000001
S-05	1	34000	0.000018	0.000003
S-06	1	32000	0.000144	0.000012
S-07	1	29000	0.000068	0.000007
S-08	1	34000	0.000068	0.000014
S-09 ^b	1			
S-10	1	33000	0.000002	0.000001
S-11	1	32000	0.000012	0.000003
S-13	1	33000	0.000004	0.000001
S-14	1	29000	0.000002	0.000001
S-16	1	33000	0.000001	0.000001
S-17	1	32000	0.000004	0.000001
S-18	1	32000	0.000009	0.000002
S-19	1	33000	0.000009	0.000002
S-20	1	33000	0.000006	0.000001
S-21	1	34000	0.000004	0.000001
S-22	1	28000	0.000004	0.000001
S-23	1	32000	0.000008	0.000001
S-24	1	34000	0.000003	0.000001
S-25	1	28000	0.000036	0.000004
S-81 ^c	1			

^a Sampler was inoperable for part of the sampling period.

^b Incomplete lab analyses.

^c Sampler was inoperable during the sampling period.

Distribution

Federal Agencies

USDOE, RFO
Attn: R.M. Nelson, Jr.
Bldg. 115

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Attn: Dr. M. Lammering,
R. Rutherford
One Denver Place - Suite 1300
999 18th Street
Denver, CO 80202-2413

USEPA
Attn: B. Lavelle
999 18th Street, Suite 500
8 HWM-FF
Denver, CO 80202-2405

State Government Agencies

Colorado Water Conservation Board
Attn: N.C. Ioannides
823 State Centennial Building
1313 Sherman Street
Denver, CO 80203

Denver Regional Council of
Governments
Attn: L. Mugler
2480 W. 27th Avenue, #200B
Denver, CO 80211

Department of Natural Resources
Attn: B. Hamlett III
1313 Sherman Street
Denver, CO 80203

Rocky Flats Environmental
Monitoring Council
Attn: G. Swartz
1536 Cole Blvd., Suite 325
Denver West Office Park #4
Golden, CO 80401

City Governments

City of Arvada
Utilities Division
Attn: C. Videtich
8101 Ralston Road
Arvada, CO 80002

City of Boulder
Office of the City Manager
Attn: J. Piper, A. Struthers
P.O. Box 791
Boulder, CO 80302

City of Broomfield
Attn: H. Mahan, K. Schnoor
#6 Garden Office Center
Broomfield, CO 80020

City of Fort Collins
Office of the City Manager
Attn: S. Burkett
300 La Porte
Fort Collins, CO 80525

City of Northglenn
Attn: T. Ambalam
11701 Community Center Drive
Northglenn, CO 80233-1099

City of Thornton
Attn: J. Ethredge, City Manager
9500 Civic Center Drive
Thornton, CO 80229-1120

City of Westminster
Attn: W. Christopher, S. Ramer
4800 W. 92nd Avenue
Westminster, CO 80030

Denver Water Department
Quality Control
Attn: J. Dice
1600 W. 12th Avenue
Denver, CO 80254

Health Departments

Boulder City/County Health
Department - Division of
Environmental Health
Attn: T. Douville, V. Harris
3450 Broadway
Boulder, CO 80020

Colorado Department of Health
4210 E. Eleventh Avenue
Denver, CO 80020
Attn: B. Barry, J. Bruch, G. Dancik,
D. Fox, P. Frohardt, D. Holme,
J. Jacobi, A. Lockhart, R. Quillin,
J. Sowinski, R. Terry, T. Vernon

Jefferson County Health Department
Attn: Dr. M. Johnson, C. Sanders
260 South Kipling
Lakewood, CO 80226

Tri County District Health
Attn: S. Salyards
4301 E. 72nd Avenue
Commerce City, CO 80022

Environmental

Advance Sciences, Inc.
Attn: D. Kaskie, M.G. Waltermire
405 Urban Street, Suite 401
Lakewood, CO 80228

American Friends Service Co.
Attn: T. Rauch
1535 High Street, 3rd Floor
Denver, CO 80218

Doty and Associates
F.H. Blaha
408 22nd Street
Golden, CO 80401

P. Elofson-Gardine
8470 W. 52nd Place, Suite 9
Arvada, CO 80002-3447